

**IN THE CLAIMS:**

Please amend the claims to read as follows:

1. (Currently amended) A method for producing a layer of ~~functional molecules on a carrier surface of a substrate, using~~ S-layer proteins ~~[[as]] on a carrier of the~~ surface to provide a carrier for functional molecules, comprising the steps of:

providing a carrier surface;

providing a first solution containing S-layer proteins ~~in the form of monomers or oligomers;~~

bringing the first solution into contact with the carrier surface and providing a reference electrode in the first solution;

depositing ~~a layer of the~~ S-layer proteins as a layer on the carrier surface at first electrochemical conditions on the carrier surface while in contact with the first solution, said electrochemical conditions being provided by applying a first electrochemical potential to the carrier surface with respect to said reference electrode in said first solution; and

forming a two-dimensional crystalline structure in the layer of S-layer proteins ~~[[thus]] while in contact with the first solution or a second solution after being deposited on the carrier surface, resulting in a fixing of the S-layer proteins at second electrochemical conditions on the carrier surface, said electrochemical conditions being provided by applying a second electrochemical potential to the carrier surface with respect to said reference electrode. [[;]]~~

~~wherein one of the steps comprises the step of forming functional molecules on the S-layer proteins;~~

~~wherein the step of depositing the layer of S-layer proteins comprises the step of setting first electrochemical conditions at an electrochemical boundary layer on the carrier surface and the step of forming the two-dimensional crystalline structure comprises the step of setting second~~

~~electrochemical conditions at the electrochemical boundary layer on the carrier surface, said second electrochemical conditions being different from said first electrochemical conditions; and~~

~~wherein said step of forming the two-dimensional crystalline structure and fixing the S-layer proteins is electrochemically controlled by applying an electrical potential to the substrate with respect to a reference electrode provided in the solution.~~

Claims 2 and 3. (Canceled)

4 (Currently amended) The method as described in Claim 1, ~~characterized in that, to change the electrochemical conditions between deposition and crystallization, wherein the layer of S-layer proteins is in contact with the first solution when forming the two-dimensional crystalline structure, and between the steps of depositing a layer of S-layer proteins and forming of a crystalline structure,~~ at least one chemical parameter of the first solution is varied.

5. (Currently amended) The method as described in Claim 1, ~~characterized in that, to change the electrochemical conditions between deposition and crystallization, wherein the layer of S-layer proteins is in contact with the first solution when forming the two-dimensional crystalline structure, and between the steps of depositing a layer of S-layer proteins and forming of a crystalline structure,~~ at least one electrochemical parameter of the first solution is varied.

Claims 6 and 7. (Canceled)

8. (Currently amended) The method as described in Claim 1, ~~characterized in that, wherein in at least one of the steps of depositing deposition of the S-layer proteins and/or the formation and forming of [[the]] a crystalline structure structures,~~ a conformation change of the S-layer proteins occurs, ~~in particular a denaturing or renaturing.~~

9. (Currently amended) The method as described in Claim 1, ~~characterized in that wherein at least one of the steps of depositing deposition of the S-layer proteins and/or the formation and forming of [[the]] a crystalline structure [[are]] is controlled by a time-varied electrochemical~~

potential [[curve]].

10. (Currently amended) The method as described in Claim 1, ~~characterized in that the deposition of the~~ wherein depositing the S-layer proteins on the substrate is carried out in a first solution containing the reference electrode and forming the formation of [[the]] a crystalline structure is carried out in a second solution.

11. (Currently amended) The method as described in Claim 10, ~~characterized in that~~ wherein a net charge is electrostatically ~~impressed on~~ applied to the substrate carrier surface before ~~dipping into it~~ is brought into contact with the first solution and said net charge is maintained until it is brought into contact with the second solution during the run through the solutions.

12. (Currently amended) The method as described in Claim 10, ~~characterized in that~~ wherein a net charge is electrochemically ~~impressed on the substrate~~ applied to the carrier surface in the first solution and ~~is kept when the solutions are changed~~ said net charge is maintained until it is brought into contact with the second solution.

13. (Previously presented) The method as described in Claim 10, ~~wherein characterized in that the change of solutions happens by transport of the carrier surface~~ is transported from [[a]] the first solution [[bath]] ~~for the deposition~~ depositing of the S-layer proteins to [[a]] the second bath for the crystallization solution for forming the crystalline structure, both the first and second solutions being in contact with the reference electrode.

14. (Currently amended) The method as described in Claim 1, ~~wherein characterized in that~~ functional molecules are bonded to S-layer proteins [[even]] before the ~~deposition~~ depositing of the S-layer proteins, and thereupon the functional molecules are deposited on the substrate simultaneously with the deposition of carrier surface together with the S-layer proteins.

15. (Canceled)

16. (Currently amended) The method as described in Claim 1, ~~wherein characterized in that~~, after

[[the]] formation of the crystalline structure in the ~~S-layer stratum~~ layer of S-layer proteins, functional molecules are deposited on the substrate layer at ~~positions defined by~~ bonding sites of the crystalline structure layer.

17. (Currently amended) The method as described in Claim 1, wherein ~~characterized in that~~, after the formation of the crystalline structure in the ~~S-layer stratum~~ layer of S-layer proteins, electrochemical nanoparticles are deposited on the substrate layer at ~~positions defined by~~ bonding sites of the crystalline structure layer.

18. (Currently amended) The method according to claim 1, wherein ~~the deposition of the S-layer proteins and the forming of the crystalline structure are controlled~~ the electrochemical potential is applied potentiostatically.

19. (Canceled)

20. (New) The method as described in claim 8, wherein the conformation change is denaturing of S-layer proteins

21. (New) The method as described in claim 8, wherein the conformation change is renaturing of S-layer proteins.